

# Standard Rectifier Module

|                         |       |
|-------------------------|-------|
| <b>3~<br/>Rectifier</b> |       |
| $V_{RRM} =$             | 800 V |
| $I_{DAV} =$             | 80 A  |
| $I_{FSM} =$             | 600 A |

## 3~ Rectifier Bridge

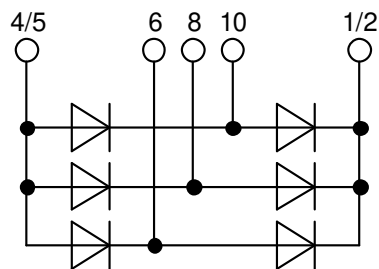
Part number

**VUO80-08NO1**



Backside: isolated

 E72873



### Features / Advantages:

- Package with DCB ceramic
- Improved temperature and power cycling
- Planar passivated chips
- Very low forward voltage drop
- Very low leakage current

### Applications:

- Diode for main rectification
- For three phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

### Package: V1-A-Pack

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 17 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

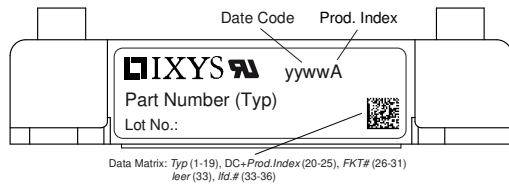
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| Rectifier  |  |   |                              | Ratings                  |      |      |                   |
|------------|--|---|------------------------------|--------------------------|------|------|-------------------|
| Symbol     | Definition                                   | Conditions  |                              | min.                     | typ. | max. | Unit              |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage |   |                              |                          |      | 900  | V                 |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     |   |                              |                          |      | 800  | V                 |
| $I_R$      | reverse current                              | $V_R = 800\text{ V}$                              | $T_{VJ} = 25^\circ\text{C}$  |                          |      | 40   | $\mu\text{A}$     |
|            |  | $V_R = 800\text{ V}$                              | $T_{VJ} = 150^\circ\text{C}$ |                          |      | 1.5  | mA                |
| $V_F$      | forward voltage drop                         | $I_F = 30\text{ A}$                               | $T_{VJ} = 25^\circ\text{C}$  |                          |      | 1.14 | V                 |
|            |  | $I_F = 90\text{ A}$                               |                              |                          |      | 1.48 | V                 |
|            |  | $I_F = 30\text{ A}$                               | $T_{VJ} = 125^\circ\text{C}$ |                          |      | 1.06 | V                 |
|            |  | $I_F = 90\text{ A}$                               |                              |                          |      | 1.51 | V                 |
| $I_{DAV}$  | bridge output current                        | $T_C = 110^\circ\text{C}$<br>rectangular          | $T_{VJ} = 150^\circ\text{C}$ |                          |      | 80   | A                 |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only                 |                              |                          |      | 0.81 | V                 |
| $r_F$      | slope resistance                             |   |                              |                          |      | 7.8  | m $\Omega$        |
| $R_{thJC}$ | thermal resistance junction to case          |   |                              |                          |      | 1.1  | K/W               |
| $R_{thCH}$ | thermal resistance case to heatsink          |   |                              |                          | 0.3  |      | K/W               |
| $P_{tot}$  | total power dissipation                      |   |                              | $T_C = 25^\circ\text{C}$ |      | 110  | W                 |
| $I_{FSM}$  | max. forward surge current                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 45^\circ\text{C}$  |                          |      | 600  | A                 |
|            |  | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$           |                          |      | 650  | A                 |
|            |  | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 150^\circ\text{C}$ |                          |      | 510  | A                 |
|            |  | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$           |                          |      | 550  | A                 |
| $I^2t$     | value for fusing                             | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 45^\circ\text{C}$  |                          |      | 1.80 | kA <sup>2</sup> s |
|            |  | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$           |                          |      | 1.76 | kA <sup>2</sup> s |
|            |  | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 150^\circ\text{C}$ |                          |      | 1.30 | kA <sup>2</sup> s |
|            |  | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$           |                          |      | 1.26 | kA <sup>2</sup> s |
| $C_J$      | junction capacitance                         | $V_R = 400\text{ V}; f = 1\text{ MHz}$            | $T_{VJ} = 25^\circ\text{C}$  |                          | 18   |      | pF                |



| Package V1-A-Pack |  | Ratings              |      |      |      |      |
|-------------------|--|----------------------|------|------|------|------|
| Symbol            | Definition   | Conditions           | min. | typ. | max. | Unit |
| $I_{RMS}$         | RMS current  | per terminal         |      |      | 100  | A    |
| $T_{VJ}$          | virtual junction temperature                                 |                      | -40  |      | 150  | °C   |
| $T_{op}$          | operation temperature  |                      | -40  |      | 125  | °C   |
| $T_{stg}$         | storage temperature  |                      | -40  |      | 125  | °C   |
| <b>Weight</b>     |  |                      |      | 37   |      | g    |
| $M_D$             | mounting torque  |                      | 2    |      | 2.5  | Nm   |
| $d_{Spp/App}$     | creepage distance on surface / striking distance through air | terminal to terminal | 6.0  |      |      | mm   |
| $d_{Spb/Apb}$     |  | terminal to backside | 12.0 |      |      | mm   |
| $V_{ISOL}$        | isolation voltage  | t = 1 second         | 3600 |      |      | V    |
|                   |  | t = 1 minute         | 3000 |      |      | V    |



| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | VUO80-08NO1     | VUO80-08NO1        | Blister       | 24       | 516847   |

**Equivalent Circuits for Simulation**

\* on die level

$T_{VJ} = 150^{\circ}C$



**Rectifier**

|              |                    |      |    |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage  | 0.81 | V  |
| $R_{0\ max}$ | slope resistance * | 6.6  | mΩ |



**Outlines V1-A-Pack**



**Remarks / Bemerkungen:**

- Nominal distance mounting screws on heat sink: 52 mm / Nennabstand Befestigungsschrauben auf Kühlkörper: 52 mm
  - General tolerance / Allgemeintoleranz: DIN ISO 2768 -T1-c
  - Surface treatment of pins: tin plated (Sn) in hot dip / Oberflächenbehandlung der Pins: verzinkt (Sn) im Tauchbad
  - Detail X:** EJOT PT® self-tapping screws (dimension K25) to be recommended for mounting on PCB <sup>L</sup>  
selbstschneidende Schraube (Größe K25) empfohlen für die PCB-Montage
- Take care on the maximum screw length according to board thickness and the maximum hole depth of 6 mm<sup>L</sup>  
Bei der Wahl der Schraubenlänge die PCB-Dicke und die maximale Lochtiefe von 6mm beachten
- Recommended mounting torque: 1.5 Nm / Empfohlenes Drehmoment: 1.5 Nm



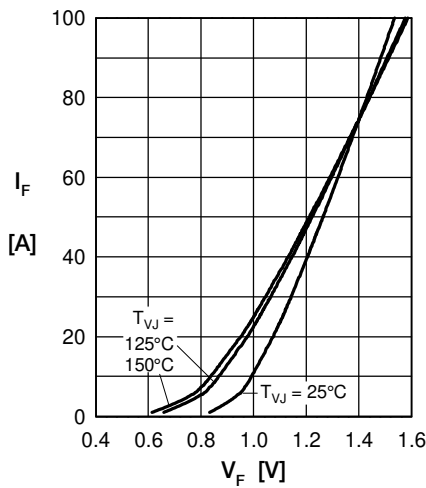
**Rectifier**


Fig. 1 Forward current vs. voltage drop per diode

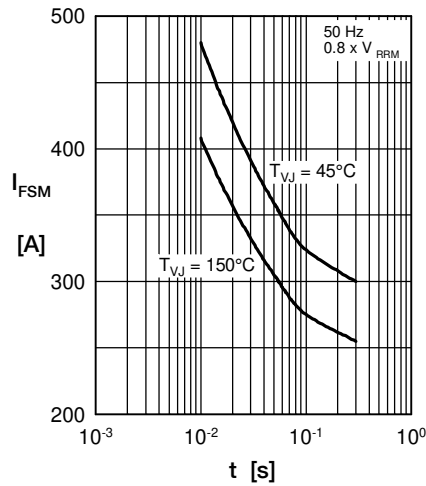


Fig. 2 Surge overload current vs. time per diode

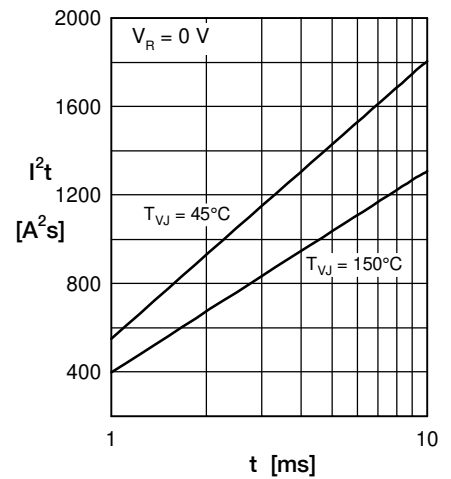
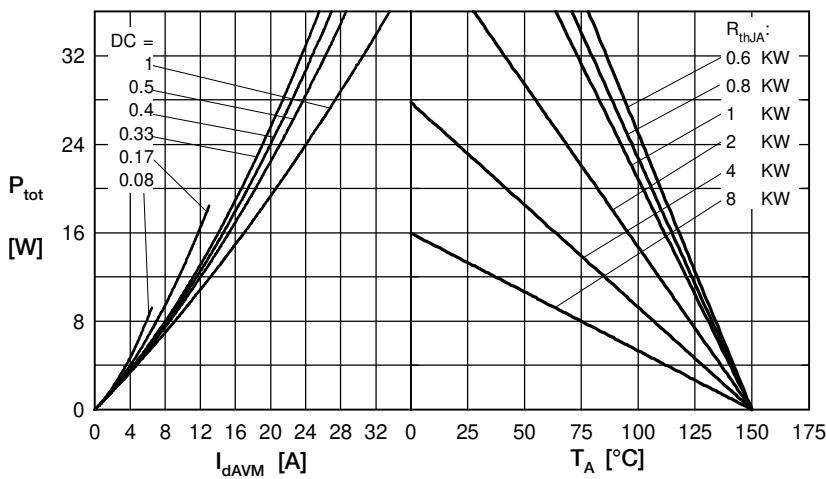

 Fig. 3  $I^2t$  vs. time per diode


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

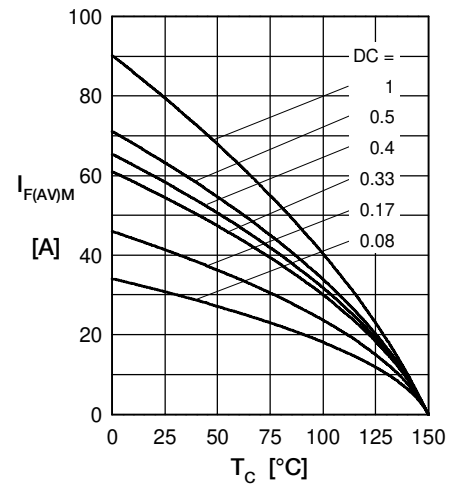


Fig. 5 Max. forward current vs. case temperature per diode

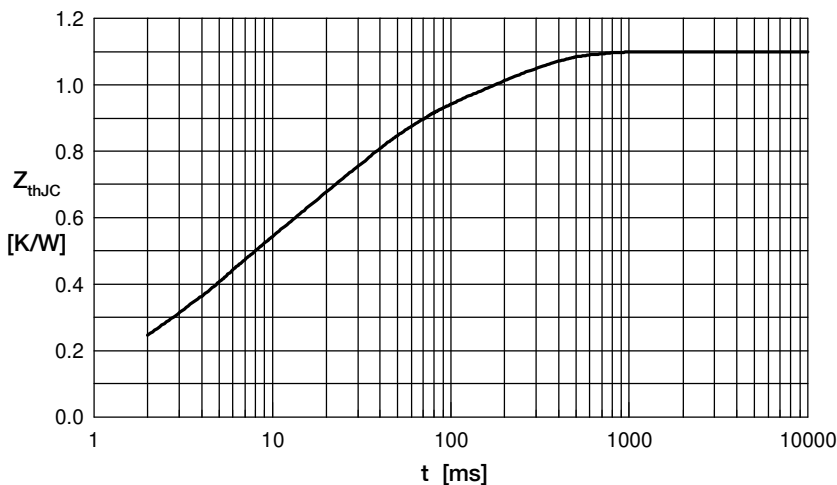


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 Constants for  $Z_{thJC}$  calculation:

| i | $R_{th}$ (K/W) | $t_i$ (s) |
|---|----------------|-----------|
| 1 | 0.0607         | 0.0004    |
| 2 | 0.1230         | 0.00256   |
| 3 | 0.2305         | 0.0045    |
| 4 | 0.4230         | 0.0242    |
| 5 | 0.2628         | 0.1800    |